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ABSTRACT

This booklet, for children, gives safety tips for electrical storms. In addition, it explains the causes of lightning and lists some activities related to lightning and static electricity. (BB)

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OWLIE SKYWARN'S LIGHTNING BOOK

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A BOOKLET FOR BOYS AND GIRLS

By Dr. Franklyn M. Branley and Leonard Kessler

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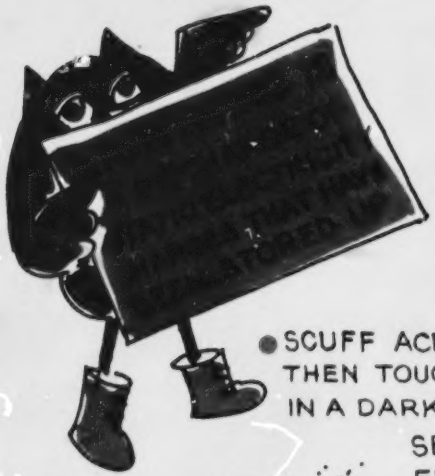
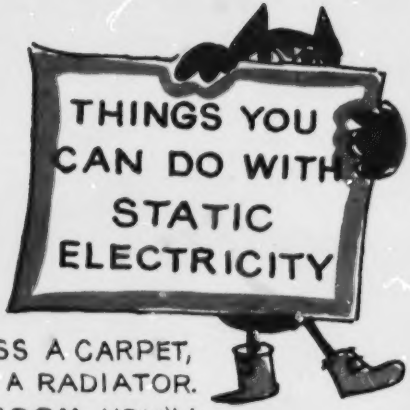
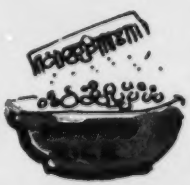


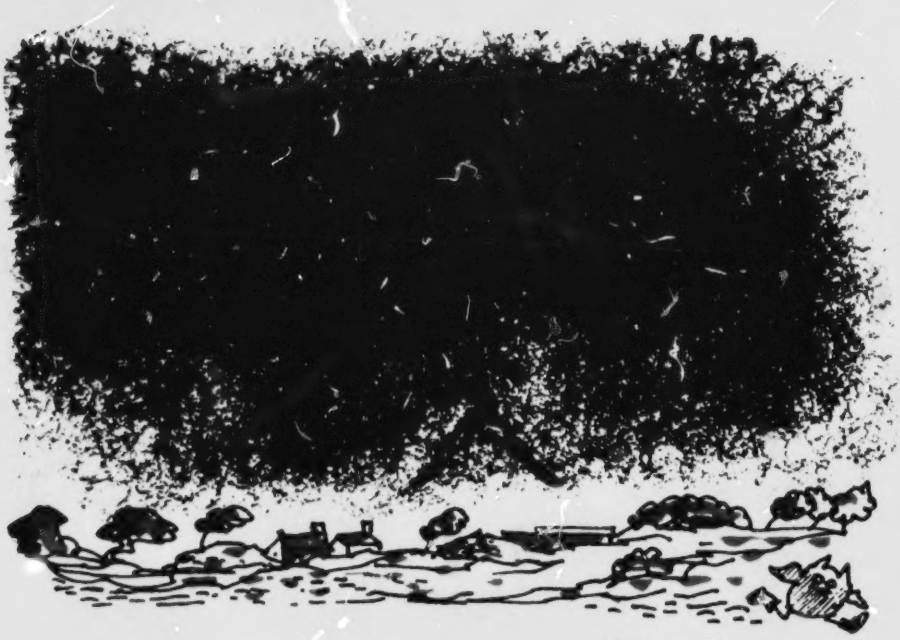


- SCUFF ACROSS A CARPET, THEN TOUCH A RADIATOR. IN A DARK ROOM YOU'LL SEE A SPARK JUMP FROM YOUR FINGER TO THE RADIATOR

- COMB YOUR HAIR WHEN IT IS DRY. YOU'LL HEAR CRACKLING. IN THE DARK YOU'LL SEE SPARKS

- Unwind a roll of cloth friction tape in a dark room. You'll see sparks.
- Blow up a balloon. Rub it on your sleeve, then hold it to a wall. The balloon will stay there.
- Turn on the water so it just barely flows in a steady stream. Rub a comb on your sleeve. Then hold the comb near the stream of water. The stream will be attracted to the comb.
- Rub a comb with silk then plunge it into a bowl of dry puffed rice. Grains will "stick" to the comb. After a while they'll pop off.





Each year you hear about hurricanes. They are violent storms that sometimes kill hundreds of people. They destroy houses, buildings, even whole towns. So do tornadoes. But lightning is worse. It kills more people than tornadoes and hurricanes together.

Each day lightning strikes somewhere. Right now about two thousand thunderstorms are occurring around the world. And many of them have severe lightning. Every day someone, somewhere is struck by lightning. Most of the people survive, but many do not. In our own country over two hundred people die each year from lightning, or from fires that are caused by lightning.

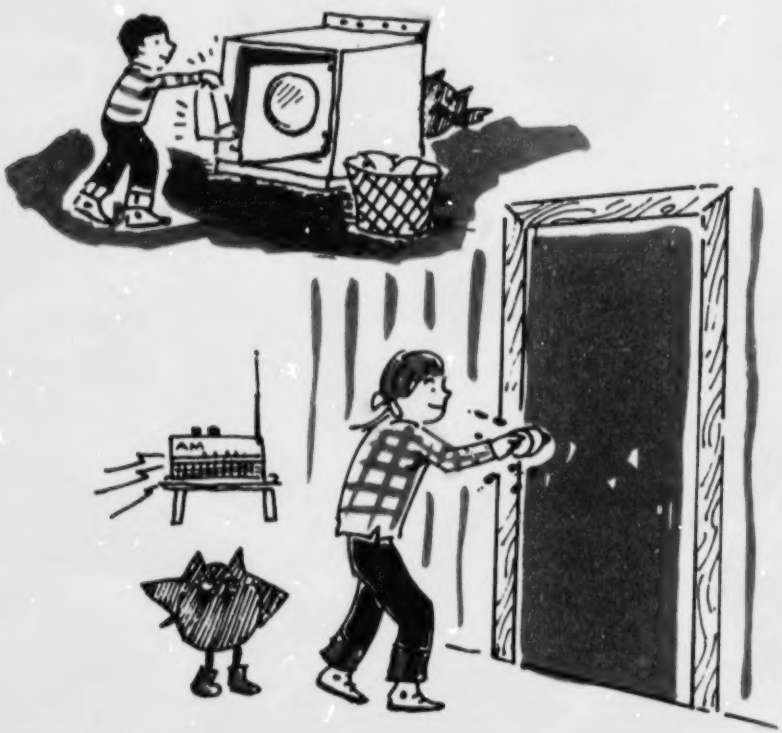
We cannot stop the lightning. But we can protect ourselves from it. First, let's see what lightning is.

Nobody knew until 1752. That's when Benjamin Franklin flew a kite during a thunderstorm and discovered that lightning is electricity. It is a sudden release of electric charges that have been stored in the clouds. (Don't ever fly a kite during a thunderstorm as Ben Franklin did. It's about the most dangerous thing a person could do. Today we marvel that Franklin wasn't killed when he did it.)

There are many safer ways to experiment with electric charges. The next time your mother uses a clothes dryer ask her to put in only the clothes—nothing else. When you take out the dry clothes they will crackle. And they'll "stick" together; held by charges of static electricity. When the air is dry, scuff across a carpet and your body becomes overloaded with electric charges. Touch a doorknob and there's an electric spark as the electricity flows from your body to the doorknob.

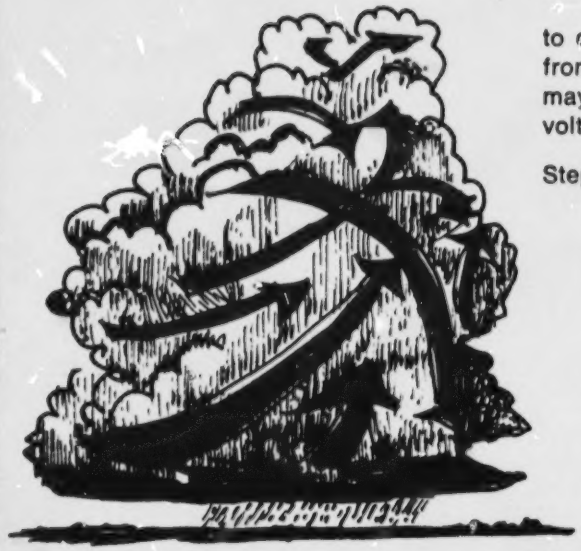
During a thunderstorm the clouds become overloaded with electric charges. When there are too many, the electricity flows to the earth, or to another cloud, making a flash of lightning.

The lightning sends out a wave that your radio picks up. When there's lightning, the radio crackles.



Lightning, thunder, and towering clouds almost always occur together. And they usually happen during warm weather. It's because air near the ground becomes very hot. This air is not as heavy as nearby air and begins to rise. There is an updraft. Nearby air rushes in faster and faster and the hot air rises more and more rapidly. As it rises, the warm air cools. Droplets of water form and clouds develop. The clouds usually tower more than seven miles (11 or 12 kilometers) above the earth. Fast moving air in the clouds breaks apart water droplets. When this happens electric charges are produced.

Winds scatter the top of the thundercloud. They break it up and spread it out. The cloud looks like a flat table atop a towering column. The cloud becomes darker and darker as more and more water collects. Violent actions are going on inside of it. Air is moving upward rapidly (updrafts), and there are places where the air is moving downward very fast (downdrafts). Inside the cloud it is snowing, raining, and hailing all at the same time.



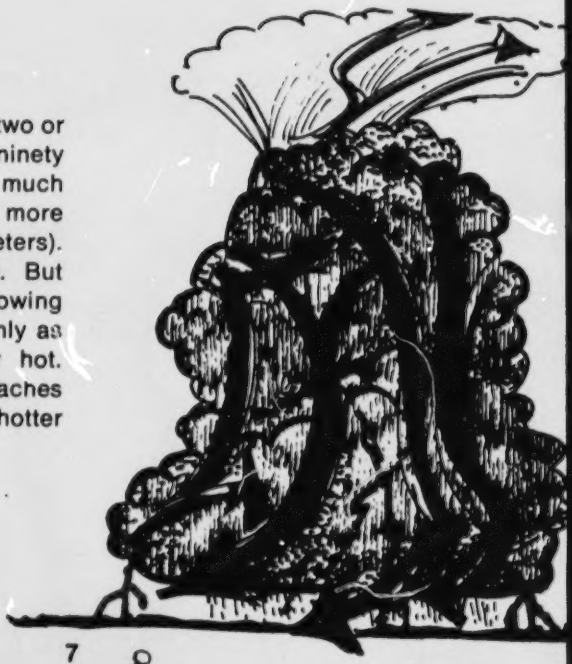
Lightning flashes go from cloud to cloud, from cloud to ground, or from ground to cloud. The charge may reach one hundred million volts.

Steps in a typical lightning flash:

1. A faint streak moves downward inside the cloud
2. A surge of electricity pushes it along one hundred feet or more at a time; it pauses, then moves on
3. A charge flows upward from a tall building, or a tree, to join the charge coming from the cloud
4. The discharge becomes strong enough to light up the paths. You see them as a lightning flash.

All this takes less than a second.

A lightning flash may be two or three hundred feet (sixty or ninety meters) long; sometimes it's much longer, as much as five or more miles (eight or more kilometers). The flash looks quite wide. But most of what you see is glowing air. The flash itself may be only as wide as a pencil. It's very hot. Sometimes the temperature reaches 30,000°C—that's five times hotter than the Sun.



You might see lightning high in the sky. It is inside the cloud. You may hear thunder, too. The lightning pushes the air from its path. It makes the air expand quickly. That's what makes the noise.

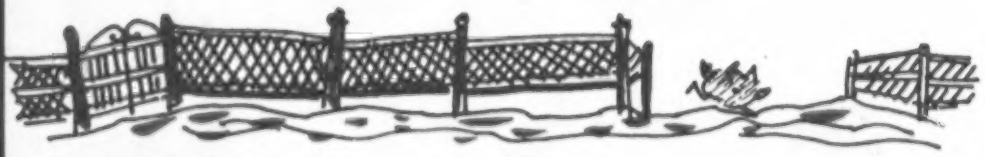
(Pop a bag full of air; push the air out into the air surrounding the bag. You'll hear how noisy air can be when it expands quickly.) If the storm is close by, the thunder sounds like a sharp explosion. When it's farther away, the thunder rumbles and rolls.

IF YOU'RE OUTSIDE-

GO INSIDE:
GET INTO A HOUSE OR LARGE BUILDING

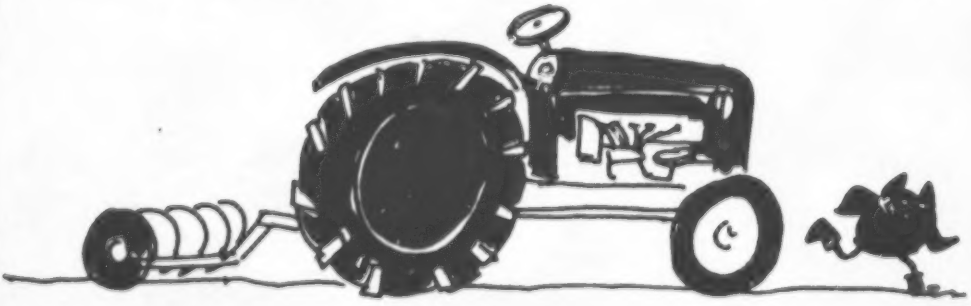
GET INTO A CAR

IF YOU MUST STAY OUTSIDE –

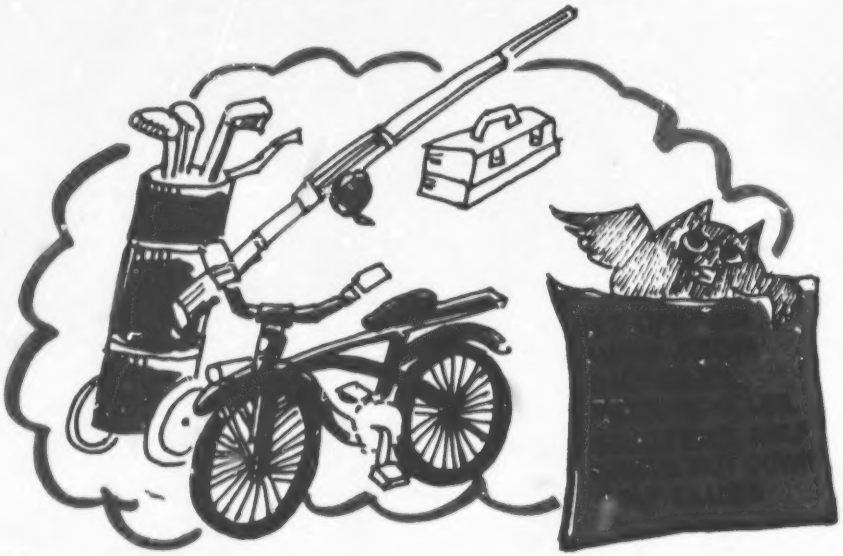


- GET AWAY FROM METAL PIPES, WIRE CLOTHESLINES AND FENCES

- GET CUT OF AND AWAY FROM A LAKE OR THE OCEAN, OR ANY WATER YOU MIGHT BE NEAR



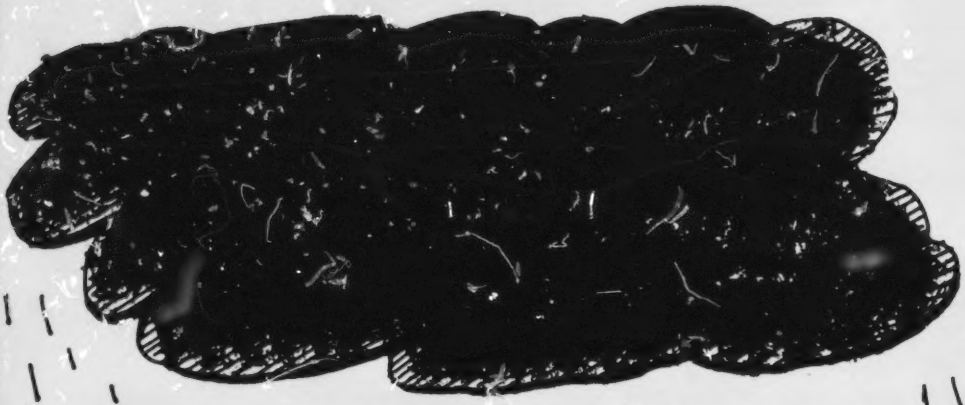
- GET AWAY FROM TRACTORS, AND ALL FARM EQUIPMENT



- GET AWAY FROM RAILROAD TRACKS - THEY COULD CARRY LIGHTNING CHARGES LONG DISTANCES

- STAY AWAY FROM SHEDS IN OPEN AREAS

- IN A FOREST GO TO A LOW AREA WHERE THERE ARE SMALL TREES. IF AREA IS OPEN GO TO A RAVINE OR VALLEY; BUT WATCH FOR FLASH FLOODS.



Sometime you may be out on a level field or prairie and you can't get to a car or to a house. You would be the tallest object around, the one closest to the clouds. You must make yourself as short as possible, but at the same time cover as little of the ground as possible. Here's what you must do.

Just before lightning strikes, your hair may stand on end. Should you feel that happen, drop to your knees. Bend forward, putting your hands on your knees. You'll be a lot lower, and only a small part of you will be touching the earth. Don't lie down—the wet earth can carry lightning.

These are things you should do to protect yourself from lightning. People who are struck by lightning probably did not do them.

IN ADDITION TO THE THINGS YOU SHOULD DO, THERE ARE ALSO SOME BIG **DON'TS**

REMEMBER THEM!

1-DON'T USE THE TELEPHONE UNLESS THERE'S AN EMERGENCY.

2-DON'T GO INTO A SMALL SHED THAT STANDS ALONE.

3-DON'T GO UNDER A LARGE TREE THAT STANDS ALONE.

4-DON'T BE TALLER THAN YOUR SURROUNDINGS. DON'T STAND ON A HILLTOP OR FISH FROM A BOAT.

5-DON'T CARRY ANYTHING MADE OF METAL OR BE NEAR ANYTHING METAL.

Not everyone knows the lightning rules. Even if they do, and even if they follow them, they may still be struck by lightning. If you're nearby when it happens, here's what you can do. You may save a person's life.

FIRST—call the police. They will send an ambulance.

SECOND—if the person is unconscious, but breathing, he will probably recover by himself.

THIRD—if the person is not breathing, get someone as fast as you can who knows how to give mouth to mouth resuscitation. Pinch the nose and be sure the tongue is not twisted. Blow in once every five seconds for adults; once every three seconds for small children. Check with your local Red Cross to learn the right way to give mouth to mouth resuscitation.

All of us must respect lightning. It is dangerous. Each year it kills hundreds of people, destroys houses and other buildings, sets fire to forests and prairies.

But we don't have to be afraid of it. There are many things we can do to protect ourselves.

CURIOUS THINGS OFTEN HAPPEN WHEN LIGHTNING STRIKES

- TREES MAY BE SHATTERED

- ONE MAN WAS HIT FOUR TIMES...

FIRST - HE LOST A TOENAIL

SECOND - HE LOST HIS EYEBROWS

THIRD - HIS LEFT SHOULDER WAS BURNED

FOURTH - HIS HAIR WAS SET AFIRE

- ONE HORSE IN A TEAM OF TWO WAS KILLED BY LIGHTNING. THE OTHER HORSE WASN'T EVEN INJURED.

- IN 1975 LIGHTNING STRUCK A LARGE TREE. IT KILLED ONE PERSON AND INJURED TWELVE OTHERS WHO WERE STANDING BENEATH IT.

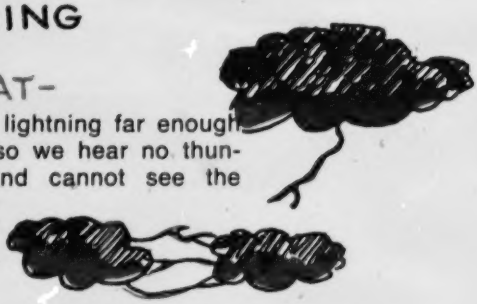
KINDS OF LIGHTNING

- **SHEET-** covers a wide area. May be inside a cloud or between clouds

- **FORKED-** two or more lightning paths, usually between clouds and the ground

- **STREAK-** also called Ribbon- the kind we usually think of. May be between clouds, or between clouds and earth

- **HEAT-** streak lightning far enough away so we hear no thunder, and cannot see the streak



- **BALL-** slow moving, glowing ball about ten inches or so across that appears to emerge from a storm cloud. May last four or five seconds.

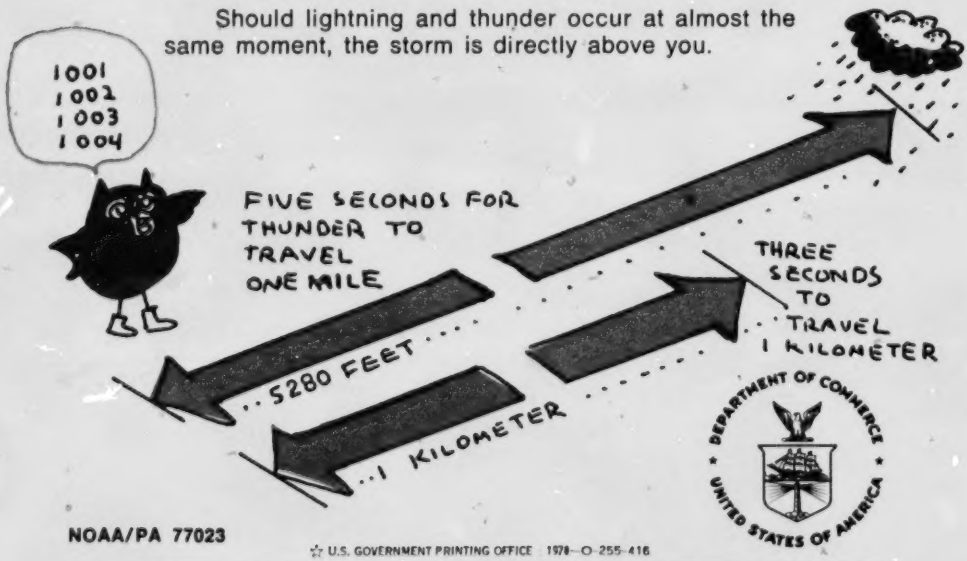
HOW FAR AWAY IS THE STORM?

Light travels 186,000 miles (300,000 kilometers) a second, so it reaches you at almost the instant it is produced.

Sound travels much more slowly—only about 1,100 feet (330 meters) a second. It takes quite a while to reach you.

When you see lightning, start counting seconds. (You can do it by saying one thousand one, one thousand two, one thousand three, and so on.) Count until you hear the thunder. If there's five seconds between the lightning and the thunder, the lightning is about 5,500 feet away—about one mile (1½ kilometers). Divide the number of seconds you count by 3 and you will find the distance in kilometers.

Should lightning and thunder occur at almost the same moment, the storm is directly above you.



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